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**D E C I S I O N**  
**of 30 August 2005**

**Case Number:** T 0865/03 - 3.2.1

**Application Number:** 97100005.4

**Publication Number:** 0788845

**IPC:** B21B 1/18

**Language of the proceedings:** EN

**Title of invention:**

Improved method for the rolling of long products and rolling line which performs that method

**Patentee:**

DANIELI & C. OFFICINE MECCANICHE S.p.A.

**Opponent:**

SMS Meer GmbH

**Headword:**

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**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

"Inventive step (yes) "

**Decisions cited:**

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**Catchword:**

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Case Number: T 0865/03 - 3.2.1

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.1  
of 30 August 2005

**Appellant:** SMS Meer GmbH  
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**Representative:** Valentin, Ekkehard  
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**Respondent:** DANIELI & C. OFFICINE MECCANICHE S.p.A.  
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**Representative:** Petraz, Gilberto Luigi  
GLP S.r.l. Piazzale Cavedalis 6/2  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 5 June 2003  
rejecting the opposition filed against European  
patent No. 0788845 pursuant to Article 102(2)  
EPC.

**Composition of the Board:**

**Chairman:** S. Crane  
**Members:** J. Osborne  
G. E. Weiss

## Summary of Facts and Submissions

- I. The appeal is directed against the decision posted 5 June 2003 to reject the opposition against European patent No. 0 788 845. The Opposition Division found that the single ground of opposition, lack of inventive step, did not prejudice maintenance of the patent as granted.
- II. The following prior art documents considered by the Opposition Division played a significant role during the appeal procedure:
- D1: Publicity brochure from MDS Mannesmann Demag Sack GmbH, "Future-oriented Mill for Special Bar Qualities", M. Appel *et al*
- D2: EP-A-0 560 115.
- III. In response to an auxiliary request from the appellant for oral proceedings the Board issued a summons pursuant to Rule 71(1) EPC. With a communication pursuant to Article 11(1) RPBA the Board indicated a provisional opinion regarding the disclosure of D1 and its relevance for consideration of inventive step of the subject-matter of the independent claims.
- IV. In a letter of reply the appellant withdrew its auxiliary request for oral proceedings and requested that the decision under appeal be set aside and the patent revoked in its entirety. The respondent requests that the appeal be dismissed.

V. The patent as granted contains two independent claims which read as follows:

"1. Method of rolling long products such as bars, rods, wires or similar products having a starting nominal transverse dimension between 120 and 180 mm and a final nominal transverse dimension between 4 and 25 mm, in a rolling line having in sequence: at least one roughing assembly (11); a reduction and sizing assembly (19) with three rolling passes; a pre-finishing assembly (25) with a plurality of rolling passes; a water cooling assembly (26); and a finishing assembly (31); comprising the steps of:  
feeding long products with a starting nominal transverse dimension between 120 and 180 mm to said roughing assembly (11) to produce respective roughing product bars;  
optionally feeding said roughing product bars to said reduction and sizing assembly (19) only when the final nominal transverse dimension of said long products is comprised in a first range between 20 and 25 mm, to reduce said optionally fed roughing product bars to the desired final nominal transverse dimension without passing through any further rolling assembly, whereby the final sizing of said long products comprised in said first range is obtained in said optional reduction and sizing assembly (19) by passing through said three rolling passes;  
feeding said roughing product bars directly to said pre-finishing assembly (25) without passing through said reduction and sizing assembly (19), only when the final nominal transverse dimension of said long products is comprised in a second range between 4 and 20 mm to produce respective pre-finishing product bars,

wherein each of said roughing product bars in said pre-finishing assembly (25) is subjected to a same reduction sequence up to the last rolling pass of said plurality of rolling passes; passing said pre-finishing product bars through said water cooling assembly (26) to reduce the temperature of said pre-finishing product bars to about 700 to 750°C, wherein the cooling water in said water cooling assembly (26) is ejected towards said pre-finishing product bars at a low pressure of about 0.6 MPa; and feeding said pre-finishing product bars in said finishing assembly (31) to produce respective finishing long products, whereby the final sizing of said long products comprised in said second range is obtained solely in said finishing assembly (31)."

"10. A rolling line for long products such as bars, rods, wires or similar products, having a starting nominal transverse dimension between 120 and 180 mm and a final nominal transverse dimension between 4 and 25 mm, comprising in sequence: at least one roughing assembly (11); two pairs of cantilever rolling blocks (13) with rolling stands having alternate horizontal-vertical axes; an reduction and sizing assembly (19) with three rolling passes able to finish said long products when their final nominal transverse dimension is in a range between 20 mm and 25 mm; a pre-finishing assembly (25) having a plurality of rolling passes; a water cooling assembly (26) able to reduce the temperature of the long products to about 700 to 750°C; and a finishing assembly (31) for finishing said long products when their final nominal transverse dimension is lower than 20 mm, the finishing assembly (31) having four rolling passes and comprising

two separate modules, each having two rolling passes, wherein at least the finishing assembly (31) and/or the reduction and sizing assembly (19) is associated with an equipment changing assembly (218, 118) able to perform the fast change of equipment."

Claims 1 and 10 are followed by claims 2 to 9 and 11 to 17 which contain all features of claims 1 and 10 respectively.

VI. The appellant's submissions may be summarised as follows:

According to the patent specification the problem to be solved is to improve the rolling mill in respect of product mix, quality and degree of use.

D1 relates to a flexible milling concept which already solves the above-mentioned problem. The high reduction machine and intermediate train in figure 1 together form a roughing assembly. Following this roughing assembly is a bar finishing train and a reduction and sizing assembly designated as an NNS block. The NNS block is followed according to figure 1 by the rod finishing block and the laying head. As shown in figure 4 a diverter leads to a branch parallel to the NNS block so that in the manufacture of rod material the bar finishing train is followed by the rod finishing block. The term "optional" in claim 1 according to the patent results in similarly different methods of manufacture of rod and bar. The only difference between the claimed subject-matter and that of D1 is that the finishing train is now designated as a pre-finishing assembly and the subsequent train as a finishing assembly. However, D2 teaches that it is

possible to improve quality in conventional rod rolling mills by providing after the rod finishing block a re-rolling stage, whereby the finishing block no longer performs the final rolling operation. The subject-matter of claim 1 results from the obvious combination of D1 and D2 and so does not involve an inventive step.

The subject-matter of product claim 10 essentially corresponds to that of method claim 1 and equally lacks an inventive step.

VII. The respondent replied essentially as follows:

According to D1 figure 1 all rolled material passes through intermediate and finishing assemblies and a sizing block designated as NNS. According to figures 3 and 4 a diverter present between the finishing assembly and NNS block conveys material either to a rod finishing mill or to the NNS block and a cooling head. The teaching of the figures is mutually inconsistent but common to all is that all rolled material, whether rod or bar, passes through at least two finishing assemblies. This is not the case according to the present claims. Moreover, D1 does not suggest the presently claimed feature whereby only products in the size range of 20 to 25 mm pass through the reducing and sizing assembly.

## Reasons for the Decision

1. The patent relates to a rolling mill for long products having a transverse dimension of between 4 and 25 mm and to a method of rolling them. The mill, as defined in claim 10, comprises a reduction and sizing assembly for finishing products having a final transverse dimension in the range between 20 and 25 mm. Correspondingly, claim 1 specifies that products having a final dimension within this range are finished in the reduction and sizing assembly without passing through any further rolling assembly. The remainder of the products to be rolled, namely those having a final transverse dimension in the range of 4 to 20 mm, bypass the reduction and sizing assembly and are fed directly to the pre-finishing assembly. According to the patent these features allow an improvement in the efficiency of the rolling mill since less time need be spent adapting the line to accommodate the various sizes of product.
  
2. D1 relates to a concept for the layout of rolling mills for producing rod and bar products from starting material in the range of 120 to 160 mm diameter. The plant according to D1 comprises a "high reduction machine" (HRM) which acts as a roughing train upstream of an intermediate mill followed by a bar finishing mill and, in parallel branches downstream of a diverter, a "Near Netshape Sizing block" (NNS) and a rod finishing block for finishing bars and rod respectively. D1 discloses a single concept for the layout of the mill; figure 1 illustrates the overall layout whilst figures 2 to 4 illustrate individual sections of the mill. However, the content of figure 1 is in some



respects inconsistent with the corresponding content of figures 3 and 4 and the remainder of the document, in particular as regards the relative positioning of the NNS block and the diverter between the rod and bar lines. Nevertheless, figure 5 shows the pass schedule for round bars and from that the following is clearly derivable:

- bars with a final diameter of 20 to 25 mm pass through the HRM, the intermediate train and at least some passes of the finishing train;
- bars with a final diameter of 13 to 18 mm pass additionally through the NNS block.

Furthermore, it is stated in the text that rod (the example given is 5.5 mm) after passing through the finishing train is diverted to a rod finishing block.

2.1 According to present claims 1 and 10 only products having a final dimension between 20 and 25 mm pass through the reduction and sizing assembly. Since the NNS block according to D1 is used only for products of 18 mm and less this cannot correspond to the reduction and sizing assembly specified in the present patent. Indeed, there is no rolling train in the mill according to D1 through which only 20 to 25 mm size products pass.

2.2 Present claims 1 and 10 moreover specify that the rolling line comprises pre-finishing, water cooling and finishing assemblies through which only the 4 to 20 mm size products pass in sequence. According to D1, on the other hand, this sequence of assemblies is upstream of any diverter so that all products pass through it. Moreover, whilst in the rolling line according to D1 rod after passing through the finishing assembly is fed to a rod finishing block, according to present claims 1 and 10 the final sizing of all products in the range 4

to 20 mm is performed in the one finishing assembly. According to the present claims the roughing assembly is the only rolling block common to all product sizes, after which the products are fed through either one or two further rolling blocks in accordance with their final size. According to D1, on the other hand, all product sizes after passing through the rouging assembly additionally to are fed through intermediate and finishing assemblies and only then are the products separated in accordance with their final size.

- 2.3 It follows from the foregoing that the basic layout of the rolling mill according to D1 differs significantly from that presently claimed. Contrary to the appellant's assertions, the difference is not merely the provision of a rolling operation subsequent to the pre-finishing and finishing assemblies resulting in these being referred to with different terminology.
3. D2 relates to improvements in a prior art rolling line in which a re-rolling block has been provided subsequent to the finishing and cooling assemblies. As set out above, the differences between the presently claimed subject-matter and that of D1 do not merely involve an additional rolling block. A combination of the teaching according to D1 and D2 therefore does not result in the presently claimed subject-matter.
4. On the basis of the foregoing the Board concludes that the subject-matter of claims 1 and 10 is not rendered obvious by a combination of D1 and D2 and therefore involves an inventive step. Since claims 2 to 9 and 11 to 17 contain all features of claims 1 and 10 respectively the same conclusion applies also to them.

**Order**

**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:

A. Vottner

S. Crane